Questions for the June 12, 2015 Technical Conference

Docket No. 15-035-T06 - Schedule 37 Rates

1. Was GRID first used in Docket No. 03-035-T10 to produce approved Schedule 37 avoided energy costs using the Docket No. 94-2035-03 method? If not, when was GRID first used for this purpose?

   Yes. Docket No. 94-2035-03 required that avoided cost rates during sufficiency period be based on the marginal energy production costs of operating the Company's existing system plus the cost of purchasing summer capacity. Deficiency period avoided cost rates are based on fixed and variable costs of proxy CCCT. GRID was first used for an avoided cost filing in Docket No. 03-035-T10. Prior to Docket No. 03-035-T10, the PD-Mac model was used to run production cost studies.

2. In Docket No. 03-035-T10, the Division described in its April 13, 2004, comments, the method the Company used for Schedule 37 avoided capacity and energy costs and referenced the GRID calculations used for avoided energy costs. Here is a Table from the Division's Discussion and Analysis addressing short run avoided capacity and energy costs from those comments:

Table 2: Short-Run Avoided Cost Calculations

Off-Peak	GRID(With 10MW Resource)	GRID(Without 10MW Resource)
On-Peak	Off-Peak + ¼ *(Annual Capacity Value of SCCT)*(8,760*CF)	

The formula for On-Peak above is inaccurate. The correct formula for On-Peak energy as defined in docket 03-035-T10 is:

On-Peak Off-Peak + ¼ *(Annual Capacity Value of SCCT) / (8,760*CF)

a) Are the GRID results from applying the formula above the average avoided energy costs for the off-peak hours in each month?
   No, they are the average energy costs in all hours.

b) If not, are these GRID results the average avoided energy costs for all hours (peak plus off-peak hours) in each month?
   Yes.

c) If not 2a or 2b, please describe how GRID produced monthly avoided energy costs in Docket Nos. 03-035-T10, 14-035-T04, and 15-035-T06.
Each referenced docket was calculated consistent with 2b.

3. The Company indicates in 15-035-T06 that short run avoided costs "are based on the displacement of purchased power, existing thermal resources, and FOTs from the 2015 IRP as modeled by" GRID.[1]
   (i) What is the difference between purchased power and FOTs in GRID?
   As referenced in the testimony, purchased power (i.e. GRID system balancing purchases) represent market transactions determined by GRID to balance the system taking into account system requirements and transmission availability. GIRD system balancing purchase quantities vary in each hour as the GRID model optimizes the system.

   FOTs (front office transactions) are specific short-term wholesale market purchases identified in an IRP as additional resources needed to balance the system capacity needs. The 2015 IRP preferred portfolio includes third quarter heavy load hour (HLH) purchase transactions. FOTs are input into the model as block transactions at the same quantity in every HLH of the quarter. FOTs are required transactions (i.e. fixed input into the model) while purchased power is selected by GRID.

   (ii) Do the prices of power purchases and FOTs vary by hour in GRID?
   System balancing purchases are priced with hourly market prices (hourly prices at each transmission bubble were purchased power is available). IRP FOTs have one price that applies to all MWh (quarterly HLH prices at each location where a FOT is modeled). HLH prices for IRP FOTs are the average HLH prices over third quarter, and calculated outside GRID and used in the GRID run as fixed input.

4. Is the GRID model an hourly system energy dispatch model capable of producing and reporting hourly energy costs?
The GRID model was not designed to report hourly energy costs. GRID determines the hourly operation of dispatchable resources and market transactions, and can report costs by plant and market on an hourly granularity; however, since several NPC items are not dependent on hourly dispatch, the main output of GRID is monthly cost reporting.

It is possible, with a great deal of post GRID filtering and sifting, to calculate hourly system energy costs. Likewise it is possible to take the difference between two hourly

[1] Direct Testimony of Brian Dickman, Appendix 2, page 3.

system incremental energy costs to get hourly avoided costs. These calculations are at times problematic – for example, long term contracts have 1.3 million data points per year.

An alternative is to shape the monthly GRID output using the relationship of on- and off-peak market prices to a flat market price. We also do this for Schedule 38 solar prices. Shaping with market sends appropriate price signals to project developers and matches the avoided cost prices with time periods where generation is valuable to the Company.

5. **Are "high load" hours and "low load" hours, as described in GRID, equivalent to peak hours and off-peak hours, respectively?**

   Yes.

6. **In prior Schedule 37 applications, the Company provided Table 11 showing the months in which it is capacity deficient up until the time when the proxy plant method is used to value avoided capacity and energy costs. Can the Company provide this Table for this docket?**

   Yes. It was provided with the filing. The filing included two sets of avoided cost calculations: Company proposed, and consistent with the January 2015 order (i.e. no method changes). The January 2015 Order version included Table 11. See below.

Year	Deficit Months / Year	Months Included
2015	3	8
2016	6	12
2017	7	12
2018	6	12
2019	6	12
2020	7	12
2021	7	12
2022	8	12
2023	8	12
2024	8	12
2025	10	12
2026	9	12
2027	9	12